

The Danish Energy and Emission Accounts

by Anna Andriianets
Statistics Denmark



The Danish Energy Accounts

- The current Danish energy accounts were constructed in the 1970's
- Consistent time series for the energy accounts exists back to 1966
- Extensive improvements - Revision of Energy Accounts - has been done in 2014.

The main source and starting point is Energy Statistics

Important distinctions:

- Energy statistics and balances
 - overall overview of supply, conversion and use
- Energy accounts
 - makes a connection to the economy.

Physical units

Basic Energy Statistics

Statistics on crude oil

Statistics on natural gas

Statistics on oil products

Statistics on electricity

Statistics on biomass

Etc.

- Energy statistics serves different purposes and are presented in different ways

Energy Balances

Geographic area

- Energy statistics put together on the same form
- Production and consumption
- Territory principle
- Detailed description of the energy sector
- Transport treated as individual sector

Other sources

- International transportation between third countries
- Prices and values
- Etc

Physical and monetary units

Energy Accounts

Economy as described in the national accounts

- The basis is the energy balances
- Complemented with data on international transportation etc
- Information on prices and values
- Supply always equals the use
- National accounts concepts
- Residence principle
- No statistical discrepancies

Energy statistics and balances

- The Danish Energy Agency ([DEA](#)) is responsible for the Danish energy statistics and balances - work is subject to the European Statistics Code of Practice for official statistics(The Five Questionnaires)
- One of the few areas where Statistics Denmark is not the responsible institution
- Close co-operation:
 - Statistics Denmark provides data to the DEA, so does Energinet.dk, Association of Danish Energy Companies, knowledge centres and consultants companies

Energy accounts

- The responsibility of Statistics Denmark
- Physical and monetary accounts
- Worked out in close relation to/as part of the national accounts
- Based on the Energy Statistics and balances of DEA and on physical and economic data collected by Statistics Denmark

Introduction to the Energy Accounts

- Supply and use of energy commodities
- Monetary accounts part of the supply use tables of the National Accounts
- Organised in a matrix-format
- Consistent time series 1966 – 2015 for both physical and monetary accounts

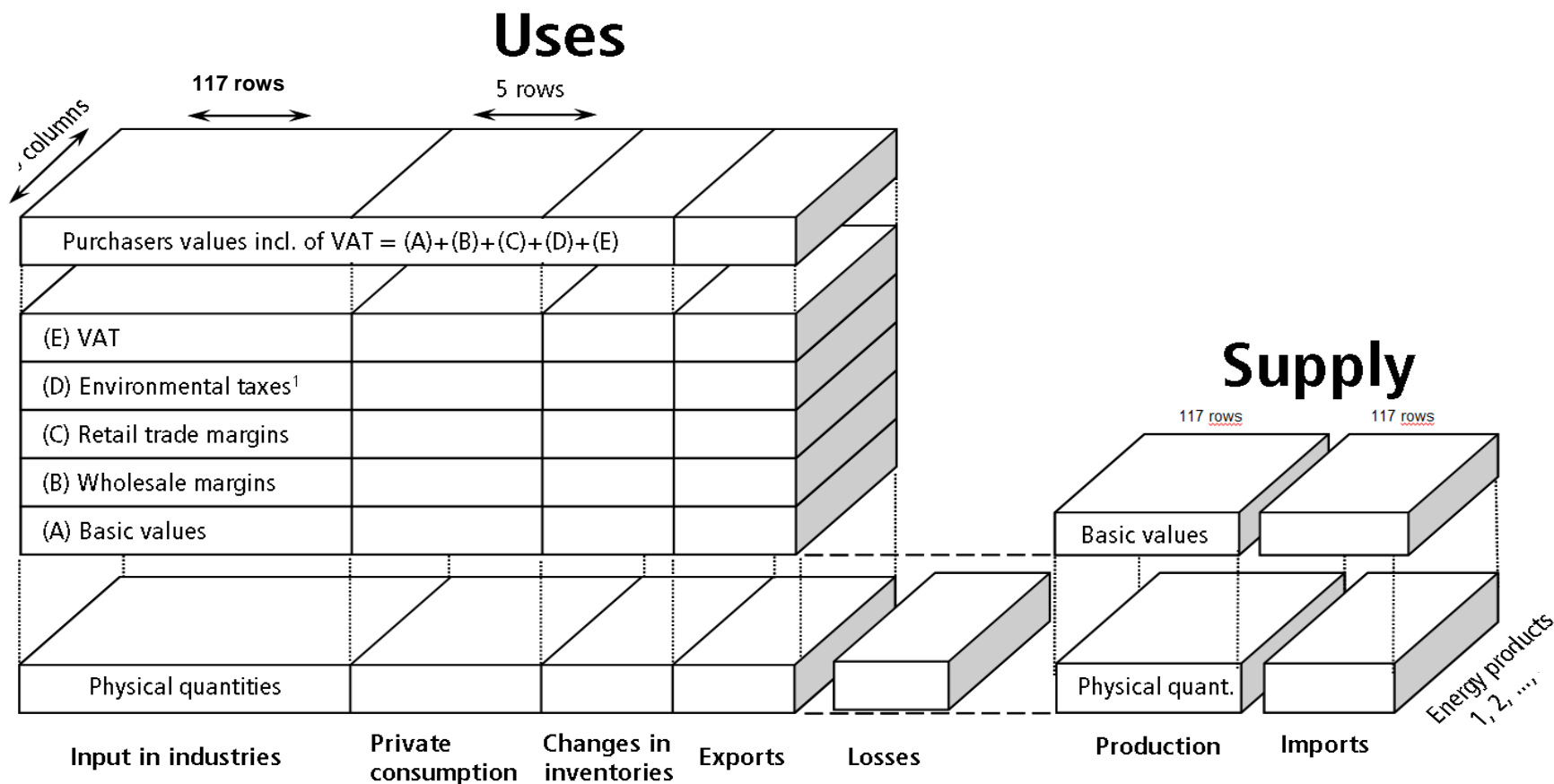
Introduction, cont.

- Columns (46)
 - Energy commodities
 - Rows in the supply and demand matrices
 - Supply (2) {
 - Danish Production in 117 industries
 - Imports
 - Uses (138) {
 - Input in 117 industries
 - 5 categories of private consumption
 - Changes in inventories
 - Exports
 - Waste and cable losses
- Electricity
 - Gas
 - Liquid fuels
 - Heat etc.
 - Petrol. and diesel

Units

- Physical quantities
 - **Specific Units:** Tonnes, m³, GWh
 - **Common Units:** Heating values (GJ)
 - Gross energy consumption (GJ)
- Monetary values
 - Basic prices
 - Wholesale trade margins
 - Retail trade margins
 - Taxes(Energy taxes, SO₂-taxes and CO₂-taxes)
 - VAT
 - Purchasers prices

The Danish Energy Accounts



¹The environmental taxes on energy are made up of CO₂-, SO₂- and energy taxes

Data Sources and compilation method

The Supply side:

- Commodity Statistics
- External trade statistics
 - Both statistics are made up in physical quantities as well as monetary values
- Balance of payments

The use side:

- The Danish Energy Agency
- Census on the energy consumption in the manufacturing industries
- External trade statistics

Method: Simultaneous compilation of physical and monetary account for better quality

Industry Break Down

- The Danish Energy Authority
 - Energy sector
 - Households
- Census on the energy consumption
 - Manufacturing industries
- Data on reimbursement of energy taxes
 - Industries not paying VAT
- Data on employment
 - Other industries. Primarily public services
- Road transport (LPG, gasoline, diesel)
 - Information on the use of vehicles

Bunkering

- Danish operated ships and planes bunkering abroad
 - Information on the purchase of fuel obtained from the balance of payments
 - Information on the unit price based on information obtained from the external trade statistics
- = Imports
- (Foreigners bunkering in Denmark = exports)

Environmental taxes

- Energy taxes, CO₂-tax, SO₂-tax
- Quantity * 'specific energy product tax rate'
- Balanced to the actual revenue recorded in the public finances account

Application: Gross Energy Consumption

- Avoid double counting
- Use of converted energy (electricity, district heat, town gas and net imports of electricity) is converted into primary energy
- The use consumed for the conversion (natural gas, coal, oil) is reset to zero
- The energy use consumed for the conversion plus losses is broken down proportionately on the users of the converted energy

Published twice a year

- Energy Accounts in full form (117 industries + 5 private consumption categories) and based on the most detailed sources are published 14 months after the reference year. Both physical and monetary.
- From this year more up-to-date physical Energy accounts are published – 6 months after the reference year.
 - Based on monthly energy statistics.
 - 21 industries and a total for the 5 private consumption categories
 - In specific and common units, as well as gross energy consumption tables

Latest published data in Statbank

- www.statbank.dk/10293

Environmental-Economic Accounts

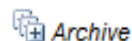
Energy and air emissions

Energy Accounts

ENE3H	Gross energy consumption in common units by industry and type of energy (1966-2015)
ENE1HO	Energy Account in specific units (summary table) by supply and use and type of energy (1966-2015)
ENE1HT	Energy Account in specific units (detailed table) by supply and type of energy (1966-2015)
ENE1HA	Energy Account in specific units (detailed table) by use and type of energy (1966-2015)
ENE2HO	Energy Account in common units (summary table) by supply and use and type of energy (1966-2015)
ENE2HT	Energy Account in common units (detailed table) by supply and type of energy (1966-2015)
ENE2HA	Energy Account in common units (detailed table) by use and type of energy (1966-2015)
ENE4HO	Energy Account in monetary values. Supply and use of energy, summary table by supply and use, unit and type of energy (1966-2014)
ENE4HT	Energy Account in monetary values. Supply of energy, detailed table (basic prices) by supply and type of energy (1966-2014)
ENE4HA	Energy Account in monetary values. Use of energy, detailed table by use, unit and type of energy (1966-2014)

Air Emission Accounts

MRU1	Emissions by industry and type (1990-2013)
MRO1	Bridge table by bridging items and type of emission (1990-2013)



Archive

Water and waste water

Energy Account, use of fuels. 2012

	CRUDE OIL AND REFINERY FEEDSTOCK	OIL PRODUCTS	NATURAL GAS, EXTRACTION AND IMPORTS	NATURAL GAS, CONSUMPTION AND EXPORTS	COAL AND RENEWABLE COKE	ELECTRICITY ENERGY ETC.	DISTRICT HEATING	
	1.000 Tonnes		Mill. Nm3		1.000 Tonnes	TJ	GWh	TJ
Total production	10.000	8.415	5.571	5.725	0	167.620	29.227	135.318
Imports	3.226	18.167	831	0	4.047	48.181	15.920	0
Total supply (=total use)	13.227	26.582	6.402	5.725	4.047	215.801	45.147	135.318
Exports	5.920	6.725	0	2.830	12	4.367	10.706	0
Changes in inventories	-1.138	1.749	0	-174	-368	646	0	0
Waste and cable losses	0	0	70	4	0	9.118	2.176	26.936
Industries and households	8.445	18.108	6.332	3.065	4.402	201.670	32.265	108.382
Households	0	2.139	0	710	1	47.075	10.026	69.476
Total industries	8.445	15.969	6.332	2.354	4.401	154.595	22.239	38.906
A Agriculture, forestry, fishing	0	539	0	39	48	2.861	1.847	1.585
B Mining and quarrying	0	23	633	17	4	1.410	100	22
C Manufacturing	8.445	990	0	684	142	8.771	7.798	5.182
D_E Utility services	0	171	5.699	1.421	4.207	136.420	1.570	1.634
F Construction	0	392	0	14	0	875	374	0
G_I Trade and transport etc.	0	13.452	0	68	0	2.380	5.606	11.327
J Information and communication ..	0	24	0	9	0	64	1.102	1.528
K Financial and insurance	0	16	0	5	0	34	192	928
LA Real estate;rent.of non-res.b.	0	27	0	2	0	82	165	344
LB Dwellings	0	10	0	2	0	31	9	373
M_N Other business services	0	106	0	19	0	305	489	3.322
O_Q Public adm., education, health ...	0	183	0	62	0	1.260	2.429	10.500
R_S Arts, entertainm., other service ..	0	36	0	12	0	104	556	2.162
Of which, danish operated:								
Ships bunkering abroad		11.065						
Planes bunkering abroad		353						
Vehicles bunkering abroad		603						

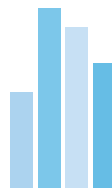
Energy Account, Basic Prices. 2012.

	CRUDE OIL AND REFINERY FEEDSTOCKS	OIL PRODUCTS	NATURAL GAS, EXTRACTION AND IMPORTS	NATURAL GAS, COAL AND CONSUMPTION AND EXPORTS	COKE	RENEWABLE ENERGY ETC.	CONVERTED TYPES OF ENERGY	TOTAL
	Mill. DKK							
Total production	47.297	42.920	10.186	12.059	0	1.399	41.961	155.822
Imports	16.082	74.645	1.614	0	2.385	2.588	5.368	102.682
Total supply (=total use)	63.379	117.565	11.799	12.059	2.385	3.987	47.329	258.503
Changes in inventories	-5.620	9.760	0	-319	-346	0	0	3.475
Exports	28.258	33.888	0	4.513	11	98	2.745	69.513
Industries and households	40.741	73.917	11.799	7.864	2.719	3.889	44.584	185.513
Households	0	11.995	0	2.540	2	873	22.742	38.152
Total industries	40.741	61.922	11.799	5.324	2.717	3.016	21.841	147.360
A Agriculture, forestry, fishing	0	2.942	0	102	51	7	1.532	4.634
B Mining and quarrying	0	137	0	50	4	11	49	251
C Manufacturing	40.741	3.322	0	2.121	152	74	5.162	51.572
D_E Utility services	0	928	11.799	2.543	2.511	2.869	1.578	22.228
F Construction	0	1.999	0	37	0	0	300	2.336
G_I Trade and transport etc.	0	50.038	0	179	0	0	5.488	55.705
J Information and communication ..	0	143	0	23	0	0	1.183	1.349
K Financial and insurance	0	117	0	14	0	0	336	467
LA Real estate;rent.of non-res.b.	0	137	0	5	0	0	200	342
LB Dwellings	0	51	0	6	0	0	81	138
M_N Other business services	0	579	0	50	0	0	1.044	1.673
O_Q Public adm., education, health ...	0	1.278	0	161	0	56	4.018	5.513
R_S Arts, entertainm., other service ...	0	252	0	33	0	0	870	1.155
Of which, danish operated:								
Ships bunkering abroad		37.621						37.621
Planes bunkering abroad		2.119						2.119
Vehicles bunkering abroad		3.018						3.018

Energy Account, Energy taxes. 2012.

		CRUDE OIL AND REFINERY FEEDSTOCKS	OIL PRODUCTS	NATURAL GAS, EXTRACTION AND IMPORTS	NATURAL GAS, COAL AND CONSUMPTION AND EXPORTS	COKE	RENEWABLE ENERGY ETC.	CONVERTED TYPES OF ENERGY	TOTAL
		Mill. DKK							
	Industries and households	0	16.937	0	3.026	5	0	15.768	35.736
	Households	0	0	0	0	0	0	-1.068	-1.068
	Total industries	0	0	0	0	0	0	0	0
A	Agriculture, forestry, fishing	0	16.937	0	3.026	5	0	16.836	36.804
B	Mining and quarrying	0	10.160	0	1.953	5	0	10.704	22.822
C	Manufacturing	0	6.778	0	1.073	0	0	6.132	13.983
D_E	Utility services	0	333	0	0	0	0	149	482
F	Construction	0	20	0	0	0	0	7	27
G_I	Trade and transport etc.	0	663	0	572	0	0	534	1.769
J	Information and communication	0	209	0	26	0	0	218	453
K	Financial and insurance	0	1.180	0	0	0	0	22	1.202
LA	Real estate;rent.of non-res.b.	0	2.868	0	166	0	0	1.124	4.158
LB	Dwellings	0	97	0	23	0	0	102	222
M_N	Other business services	0	63	0	15	0	0	243	321
O_Q	Public adm., education, health	0	112	0	6	0	0	89	207
R_S	Arts, entertainm., other service	0	41	0	6	0	0	25	72
	Of which, danish operated:								
	Ships bunkering abroad		-						-
	Planes bunkering abroad		-						-
	Vehicles bunkering abroad		-						-

The Danish Emission Accounts



The Danish Emission Accounts

- Statistics Denmark has been compiling air emission accounts since the late 1980's
- The current air emissions accounts were established in 2013 based on a more detailed source data.
- Consistent time series for air emissions of 14 substances exists back to 1990 (PM_{2,5} and PM₁₀ until 2000 og F-gasses back to 1995)

Emission Inventories vs. Emission Accounts

- **Emission Inventories**

- Responsibility of the University of Aarhus.
- Greenhouse gases are reported annually to the UNFCCC(*United Nations Framework Convention on Climate Change.*)
- Other pollutants are reported annually to the UNECE(*United Nations Economic Commission for Europe*)

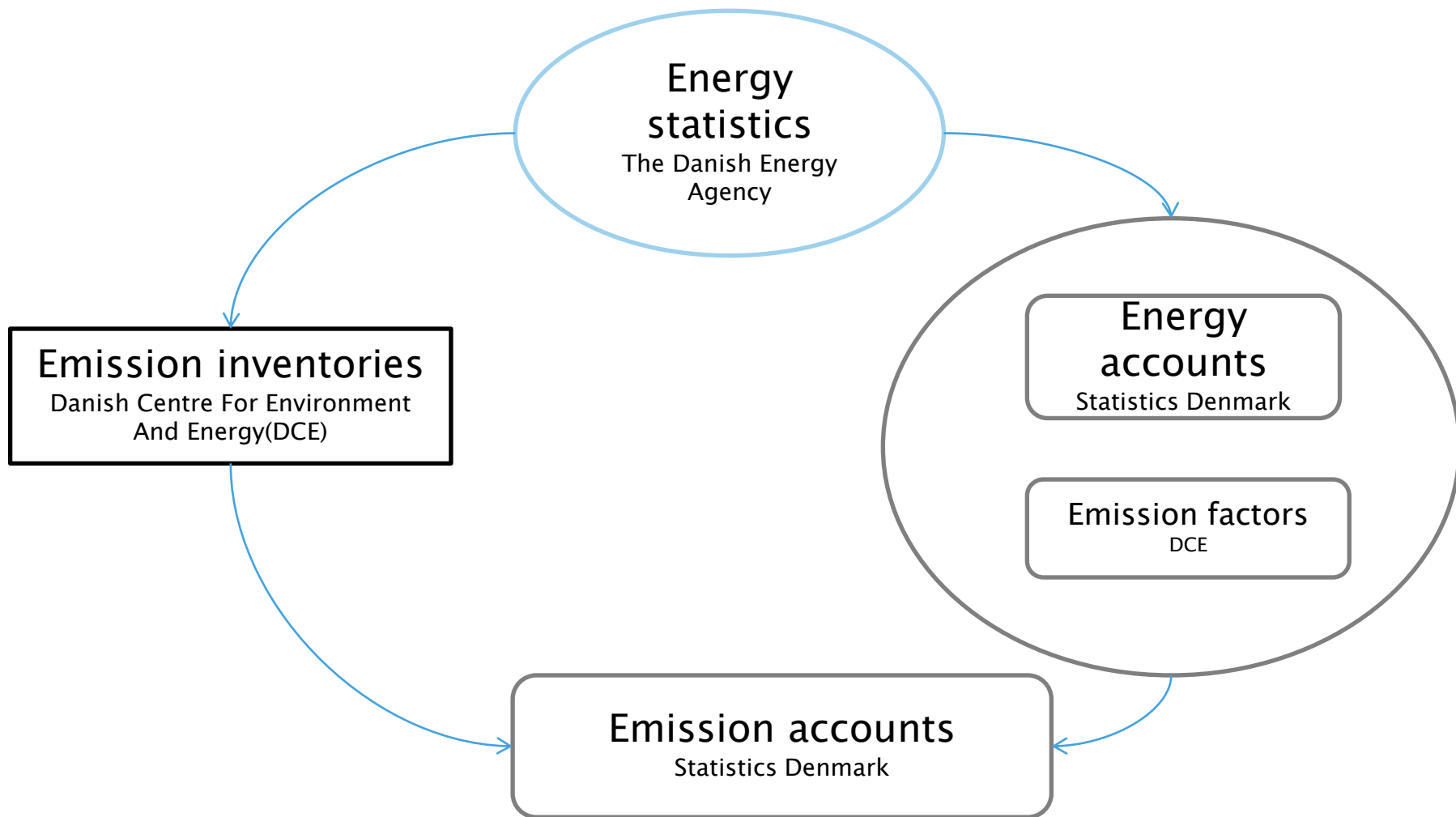
- **Emission Accounts**

- Responsibility of Statistics Denmark
- 14 pollutants annually reported to the Eurostat

Emission Inventories vs. Emission Accounts

Air emissions inventory	Air Emissions Accounts
Territorial principle	Residence principle
Process-based allocation of emissions	Allocation of emissions to economic activities
Breakdown by seven sectors (Energy, industrial processes; solvent and other product use; agriculture; land use, land-use change and forestry; waste; other)	Breakdown by industries (NACE 2-digit level) and households
Functional allocation of transport emissions	Allocation of transport emissions to the final producer

Common starting point energy statistics

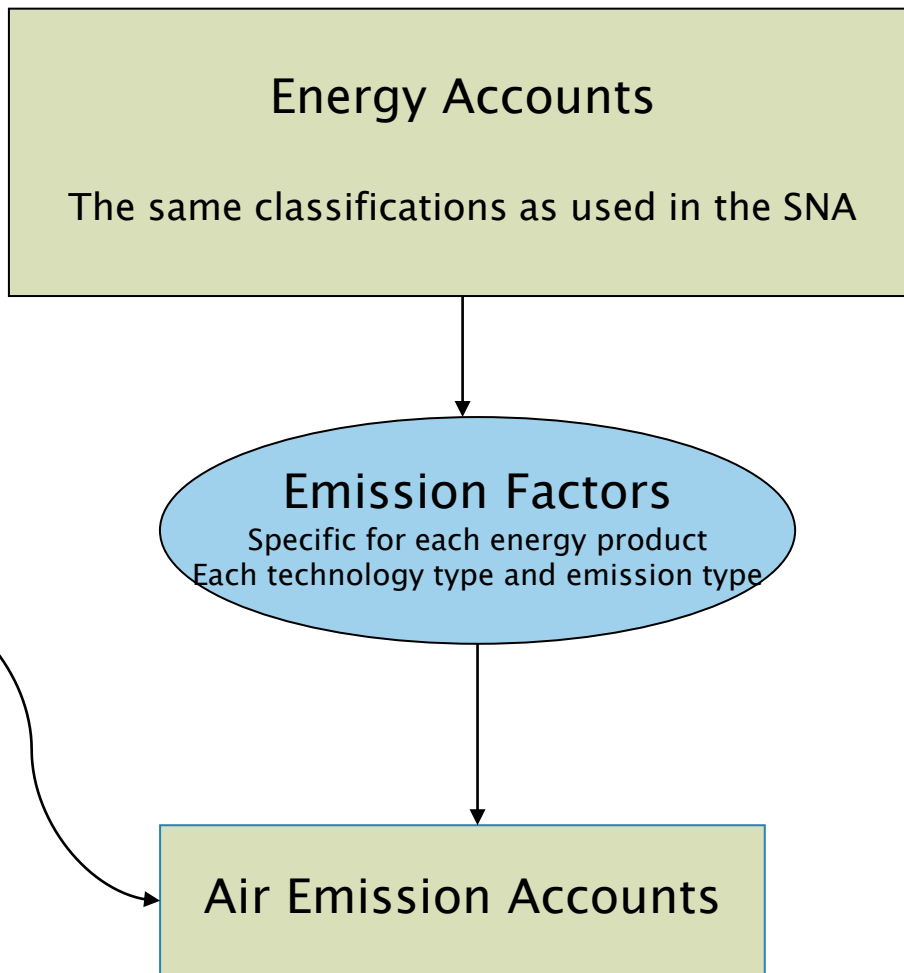


Energy First Approach

Directly from
Emission
Inventories:

Emissions
not connected to
combustion of energy:

Industrial processes
Agriculture
Automobile road abrasion
Automobile tyre and
brake wear



Data Sources

- Danish Centre For Environment And Energy(DCE). Aarhus University.
 - Emission levels
 - Emission coefficients

Both available on the level of 6-digits snap code

Statistics Denmark

- Energy Accounts
- Vehicle Stock statistics
- Supply and use tables

Emissions from combustion of fuels.

- **Energy First** - Starting with Energy Accounts and calculating emissions, using specific emission factors
- **Stationary combustion**(for each combination of energy product, industry and technological type)
- **Transport related emissions**(Vehicle type and energy product specific coefficient) – the detail level the source data is also on the type of road
- **Emissions from Bunkering**

Emissions=Energy consumption(GJ) x Emission koefficient(kg/GJ)

Non-energy related emissions

- Agriculture (directly from Emission Inventories)
- Emission from processes and product use in industries.
 - The Danish Supply and Use tables are used to allocate emissions from processes that are related to many industries
- From transport (road abbraision, tyre and brake wear)
Snap 0706-0708
 - Distributed using very detailed vehicles stock statistics

F-gases

- Emission Inventories are the only source
- Distributed using the information from the Danish Energy Supply and Use tables

Publishing of the results

- All substances 21 month after the reference year on the 117 industry level and a bridging table
- For CO₂, CH₄, N₂O 9 months after the reference year
 - For the first time this year
 - On the 21 industry level
 - Based on the preliminary Energy Account data for the most recent year
 - The emission coefficients from the currently available Emission Inventory
 - Non-energy related emissions from last year, though adjusted for the cement industry activity data and the changes in the livestock

MRU1: Air Emission Accounts by industry and type of emission


Download file as...

Excel (*.xlsx) 

☐ Codes in sep. columns

☒ Incl. Footnotes etc.

Edit table

Pivot (clockwise) 

 Calculate

Graphics

Line Chart 

 Sort table


 Print

Air Emission Accounts by type of emission, industry and time

	1990	1995	2000	2005	2010	2013	2014	2015
Carbon dioxide incl. biomass (CO₂), 1000 tonnes								
Total	70 088	80 406	82 689	97 427	101 953	91 217	87 808	83 791
Households	11 871	12 212	12 113	13 031	13 740	12 153	11 239	11 342
Total industries	58 218	68 194	70 576	84 397	88 213	79 064	76 569	72 449
A Agriculture, forestry and fishing	3 643	3 409	3 057	2 861	2 535	2 514	2 455	2 475
B Mining and quarrying	1 127	1 449	2 456	2 429	2 104	1 805	1 794	1 805
C Manufacturing	7 857	9 004	8 529	7 989	6 444	6 008	5 969	5 622
D_E Utility services	27 066	33 634	28 158	27 654	31 197	26 542	23 106	20 093
F Construction	900	881	1 136	1 469	1 595	1 374	1 620	1 626
G_I Trade and transport etc.	16 033	18 364	25 793	40 116	42 616	39 252	40 095	39 292
J Information and communication	151	120	127	109	110	77	72	72
K Financial and insurance	87	51	54	72	65	55	50	50
LA Real estate activities and renting of non-residential buildings	44	36	70	84	99	82	78	44
LB Dwellings	50	34	21	21	31	33	35	67
M_N Other business services	252	223	289	458	426	348	371	368
O_Q Public administration, education and health	849	856	720	944	826	843	804	814
R_S Arts, entertainment and other services	160	133	166	190	167	132	120	119

Unit : -

Contact : Anna Andriianets  ana@dst.dk  +45 39 17 30 66

Information :  Show documentation of statistics

You can save your retrieval for later use and have automatic notification when your table is updated.

► [Click here to register](#)

Bridging Table

MRO1: Bridge table by bridging items and type of emission

Download file as...

Excel (*.xlsx)



Edit table

Pivot (clockwise)



Graphics

Line Chart



Sort table



Print

☐ Codes in sep. columns

☒ Incl. Footnotes etc.



Calculate

Bridge table by type of emission, bridging items and time

	1990	1995	2000	2005	2012	2013	2014
Carbon dioxide incl. biomass (CO2), 1000 tonnes							
Total emissions from Danish economic activities (Green National Accounts) (1)	70 088	80 406	82 689	97 427	93 111	91 217	87 808
Total emissions abroad (international transport) (2)=(2.1)+(2.2)+(2.3)	9 448	11 373	19 583	34 446	37 935	33 966	34 664
Emissions caused by Danish operated ships abroad (2.1)	9 176	10 947	19 068	32 343	34 504	30 937	30 388
Emissions caused by Danish operated planes abroad (2.2)	272	426	514	1 620	1 212	1 762	2 021
Emissions caused by Danish operated vehicles abroad (2.3)	0	0	0	484	2 219	1 267	2 255
Other differences in emissions from transport and cross border trade (3)	2 508	1 806	1 990	830	629	666	918
Total emissions originating from the Danish territory (IPCC method) (=(1)+(2)+(3))	58 132	67 227	61 116	62 151	54 547	56 585	52 226

Unit : -

Contact : Anna Andriianets ✉ ana@dst.dk ☎ +45 39 17 30 66

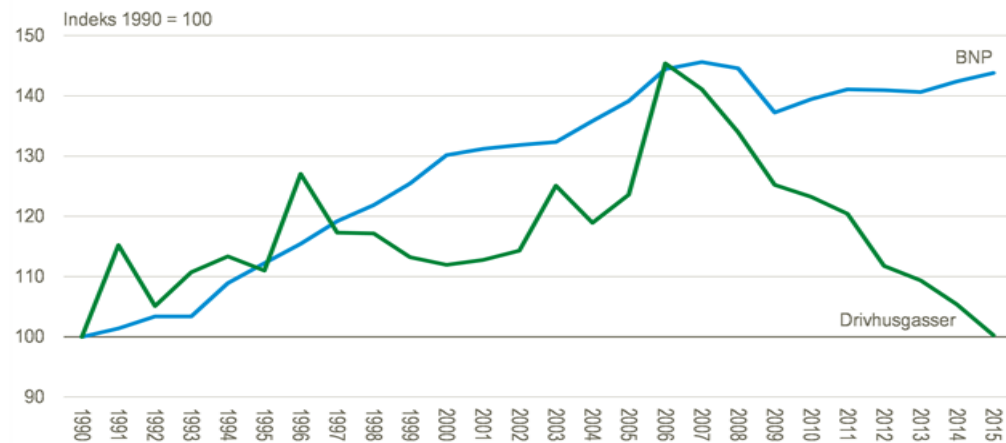
Information : 📄 Show documentation of statistics

Udslippet af drivhusgasser faldt yderligere i 2015

Emissionsregnskab 2015

Det samlede udslip af drivhusgasser fra alle danske økonomiske aktiviteter, der bidrager til BNP, faldt 4,9 pct. i 2015 i forhold til året før. Fra 2006, hvor udslippet af drivhusgasser toppede på 117 mio. tons målt i CO₂-ækvivalenter, til 2015 er udslippet faldet med 31 pct. Udslip af drivhusgasser fra danske økonomiske aktiviteter i 2015 er på niveau med 1990 og ligger på 81 mio. tons.

Udvikling i udslip af drivhusgasser fra danske økonomiske aktiviteter




Anm.: Udslip forårsaget af skibe, fly og køretøjers bunkring i udlandet er medregnet.

Reduceret udslip af drivhusgasser trods økonomisk vækst

Der er fortsat en afkobling mellem den økonomiske vækst og udviklingen i udslip af drivhusgasser i 2015. Der er tale om afkobling, når væksten i udslippene er lavere end den økonomiske vækst. Danmark har siden 1990 haft en betydelig økonomisk vækst, hvilket i sig selv har trukket i retning af større udslip af drivhusgasser gennem et øget

Nyt fra Danmarks Statistik

26. september 2016 - Nr. 406

 [Hent som PDF](#)

Næste udgivelse: 20. september 2017

Kontakt

 [Anna Andrianets](mailto:anna.andrianets@statistikbanken.dk), tlf. 39 17 30 66

Tabeller fra Statistikbanken

 [Oversigt i Statistikbanken](#)

-  [Overgangstabel](#)
overgangsposter og emissionstype
-  [Emissionsregnskab](#)
branche og emissionstype
-  [Energiregnskab i specifikke enheder \(detaljeret\)](#)
anvendelse og energitype
-  [Energiregnskab i specifikke enheder \(oversigt\)](#)
tilgang og anvendelse og energitype

[Vis flere »](#)